UTILITIES

CHAPTER 7

INTRODUCTION

This chapter presents an overview of the current utility services as provided by the City and other private utilities to Troy and surrounding service area. The location and capability of utility infrastructure are two of the most important factors linking what types of future development can be supported, to what degree, at what locations or with what needed modifications.

CITY OF TROY PUBLIC WORKS DEPARTMENT

The Public Works Department is comprised of 3 divisions: Operations, Utilities, and Engineering, totaling 76 full-time employees, who are responsible for providing safe drinking water, wastewater treatment, distribution and collection services, solid waste and recycling services, vehicle and equipment fleet maintenance, and street maintenance. The Utilities Division is the largest of the three divisions with 38 employees.

The Utilities Division operations are funded with water and sewer rate revenues. Troy's water and sewer rates and quality of services are very competitive compared to other cities in the Miami Valley area.

A 2004 City of Englewood study of 65-70 local communities showed that Troy's average quarterly charge for water was $85.38, compared to $85.14 for Piqua and $91.95 for West Milton. The survey range was $30.75 (Enon) to $195.91 (Jefferson Water Authority I). The range of rates reflects the disparity of utilities ranging in size from Dayton ($44.62) to small county or village systems. The smaller systems are often served by package-type wastewater plants and provide water service that itself can vary from non-softened waters to Troy's lime-softened supply, which is one of the softest water supplied in the Miami Valley. Average quarterly water cost for all those surveyed is $75.90.

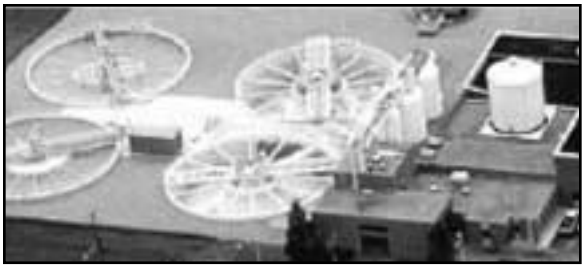
Troy's average quarterly charge for sewer was $75.84 compared to $93.03 for Piqua and $120.75 for West Milton. The survey range was $45.51 (West Carrollton) to $136.83 (Greene County). Average quarterly sewer cost for all those surveyed is $89.52. Troy's combined water and sewer rate of $161.22 was also lower than Piqua ($178.17) and West Milton ($212.70). The average of those surveyed was $162.82, with the lowest combined cost for water and sewer for the same utility being Dayton at $94.28, and the most expensive being Washington Court House at $253.20, reflecting those variables discussed above. Rates were in effect as of March 1, 2004, for quarterly consumption of 3,000 cubic feet of usage.

Troy sells water and sewer services to Miami County and through the County agreement to West Milton. There are about 1,368 water accounts and 1,233 sewer accounts serviced by the Miami County Sanitary Engineer in which Troy provides water or sewage treatment for through 20-year agreements between the City Council and County Commissioners dated 2003 and 1988 respectively. West Milton's average water consumption is approximately 0.4 million gallons a day (MGD), using the dates of December 2003 through August 2004.

WATER SUPPLY AND TREATMENT

A community's existence and ability to grow is contingent upon having adequate quantities of safe drinking water, and having a water system capable of supporting fire protection needs.

Troy obtains its public drinking water supply from buried valley sand and gravel aquifers associated with the Great Miami River. The City currently utilizes ten gravel-packed production wells to draw water from the buried-valley aquifer for treatment at the Water Treatment Plant. Each of these wells are located either at the Miami Shores Golf Course or in the vicinity of the Troy Community Park/Stadium/Hobart Arena areas adjacent to the Great Miami River. The wells range from 68 to 124 feet in depth; with screen diameters of 14 to 25 inches; gravel packs averaging 4-6"; and produce between 0.9 - 1.8 million gallons a day (MGD).



The raw well water is pumped to the Water Treatment Plant (WTP) at 300 E. Staunton Road where it is softened, clarified, disinfected, and filtered prior to being pumped to approximately 28,000 water customers on approximately 9,200 accounts. The mission of the Troy WTP is to provide an adequate supply of safe and aesthetically pleasing drinking water, complying with all Federal and State of Ohio health standards.

After treatment, water is maintained at a sufficient pressure for residential, commercial, industrial, and fire fighting purposes. The City currently pumps approximately 5.3 MGD's to the distribution system through July 2004, with the recorded one day peak consumption being 7.45 MGD (July 8, 2002).

In 1971, an 8 MGD, lime-softening WTP was constructed near the original 1937 lime-softening plant. In 1999, a multi-phased expansion project was completed to allow for a future treatment capacity of up to 16 MGD. This project included a 4 million gallon clear well and new power station (1997); 4 filters, 2 clarifiers, pump station and a chemical feed system (1999).

In recognition of the City's commitment to providing excellent water to its consumers, in May of 2000, Troy received one of only five annual Outstanding Public Water Systems awards from the Ohio Environmental Protection Agency. This annual recognition is only given to public drinking water systems maintaining 100% compliance with the Safe Drinking Water Standards, the Safe Drinking Water Act, and requirements of the Ohio Drinking Water Laws.

Future planned improvements include siting several new wells, completing the 2004 addition of generation equipment to provide emergency electrical power to the WTP and several existing wells, and adding a booster station to better service the pressure needs of the far northwest quadrant of the distribution system.

In conjunction with the Troy Fire Department, the Troy water system has jointly earned an "Insurance Services of Ohio" (ISO) rating of 4, which is a very good rating for a community the size of Troy, on a scale ranging from 1 to 10. Very few communities can earn a 1 or 2 rating under the stringent review process involved evaluating fire departments for staffing, training, equipment, notification systems, response capabilities and water systems' water supply, distribution system and storage, redundant systems, duration for maintaining fire flows and pressures, training, etc.

GROUNDWATER PROTECTION

Troy completed its wellhead protection program development in 1994. Figure 7-1, located at the end of this chapter, shows the Wellhead Protection areas in Troy. The map includes the modeled 1-year and 5-year time of travel boundaries, which, based on computer modeling under conservative conditions, shows that a drop of water falling on the land surface at these boundaries, along with potential contaminate molecules could migrate and be captured by one of Troy's present 10 production wells. Potential contaminate sites were located and studied, then ranked as high, medium or low for additional monitoring and study. The time of travel boundaries were used to enact overlay protection zones, called "WO" for Wellhead Operation district and "WP" for Well Field Protection district which are overlaying zoning districts depicted on the Troy Zoning Map (Figure 9-1), located at the end of Chapter 9.

The "WP" Well Field Protection Overlay District, as regulated by Section 1000.12570 of the Troy Zoning Code, is designed to safeguard the public health, safety, and welfare of citizens and institutions that are customers of the City's water system. This is done through regulation of the land use, storage, handling, operation use, and production of regulated substances. The intent of this designation is to protect the community's potable water supply against contamination. These regulations prohibit uses such as sanitary landfills, landfills composed of demolition debris, and dry wells. In addition, activities such as excavation, extraction, mining, or processing of sand, gravel, and limestone require approval by the Troy Board of Zoning Appeals. Business owners and operators within the "WP" Well Field Protection Overlay District are required to implement best management practices (BMP's) to reduce the risk of release and pollution of the environment.

WATER DISTRIBUTION SYSTEM

The City of Troy also owns and operates three elevated storage tanks or commonly known as "water towers". The 1 MG "Herrlinger Tower" is located on the east side of Union Street at Herrlinger Park; the 0.5 MG "Stanfield Tower" is located on the south side of West Stanfied Road; and the 2 MG "Barnhart Tower" is located on the west side of Barnhart Road, south of West Market Street or State Route 55. These water towers can store up to 1 MG on the Low Service distribution zone, and 2.5 MG on the High Service zone, for a total of 3.5 million gallons of water.

Troy's water distribution system is currently separated into two zones known as Low Service and High Service. Low Service (LS) covers the older, lower-lying portion of Troy between the Great Miami River, Ridge Avenue and extends southward and eastward to the corporation lines. High Service (HS) covers the area northeast of the Great Miami River, west of Ridge Avenue, and feeds the points of connection where Troy provides water under agreement to Miami County areas north and southwest of the City's limits, and to West Milton. Pressures range between approximately 50 and 65 PSI in the LS zone, and between 40 and 90 PSI in the present HS zone.

The northwestern most section of the High Service (HS) zone will be separated in late 2004/2005 to create a booster station equipped "Extra High Service" (EHS) zone to elevate pressures in this area to a range of 50-70 psi by drawing suction from HS.

Figure 7-2, the "Troy Area Water District," shows the generalized water distribution system for the City, including existing trunk mains and water storage facilities locations.

The majority of the distribution system is comprised of 6-inch through 12-inch piping. There are minor areas of predominantly older neighborhoods serviced by less than 6-inch mains which are for the most part looped and therefore provide adequate service to such areas. There are also larger trunk lines (16-inch to 24-inch) which connect major sections of the City.

The Water Distribution section of the Utilities Division is responsible for maintaining, testing, and repairing 131 miles of water mains buried beneath Troy's streets, including 1,126 fire hydrants located in the City. This unit is also responsible for reading and maintaining over 9,200 water meters each month. Troy has cast iron pipe dating back to 1884 or even earlier, but still in service and in good condition due in part to the quality of the water treatment.

As Troy has grown, its water usage has increased over the years due to the increase in the amount of new development from residential to industrial uses, and on a lesser scale, due to changes in residential water use with the addition of lawn irrigation, hot-tubs, and other water-using appliances. At the time, associated improvements in well supply, treatment, distribution and storage have taken place. As population and commercial/industrial development continues, the demand for water and fire protection will increase. Given the current design capacities, the existing treatment plant, ground and elevated storage tanks, and pumping facilities, Troy can meet anticipated demands well into the future with minimal effort. Water revenues are sufficient to maintain an excellent bond rating for borrowing purposes and to support the needs of the water operations.

STORM WATER MANAGEMENT

The storm water management system and how it is designed, operated, and managed is directly related to flooding and flood control. The storm water management system plays an important role in controlling discharge to minimize flooding potential within drainage areas.

Troy's storm water drainage and detention system is both natural and man-made. It is comprised of a network of storm sewers, creeks/ditches, and storm water management ponds. Troy adopted a storm water management ordinance in 1982.

The Sewer Maintenance unit of the Utilities Division is responsible for maintaining and repairing nearly 73 miles of storm sewer (6 inches through 60 inches), all manholes, storm water catch basins, and culverts. Work crews use advanced technology to clean and inspect storm sewers with jet-vac trucks and specialized equipment with video cameras, so that they function adequately and convey storm flows to ditches and eventually to the Great Miami River. Staff is also involved in maintaining some of the improved drainage ditches in Troy. The storm water collection system also includes two lift stations built in the mid-1970s in response to particular flooding problems and safety access. The first is located at the Race Drive Underpass under the CSX, where the storm sewer system is located above the underpass street elevations, and where the underpass was lowered for emergency vehicle access to the eastern end of Troy. The second is on North Madison Street where storm water from the adjacent neighborhood must be lifted into the Morgan Ditch, an open channel out-letting to the nearby Great Miami River.

Despite the capabilities of Troy's existing storm water management system, larger storms sometimes result in yard and street flooding. To minimize existing and anticipated flooding due to excessive storm discharge, Troy has implemented well over $4 million in major, phased improvements in various areas of the City and in Staunton Township. These improvements are to better accommodate flood flows and reduce nuisance flooding within the living levels in homes near the Kidder Ditch in the northeast portion of the City. Refer to Chapter 6, Physical Characteristics, Drainage, for additional information.

The City also experiences flooding hazards within natural floodplains running along and proximate to the Great Miami River. To mitigate this type of flooding, Troy and neighboring communities participate in the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP).

WASTEWATER COLLECTION AND TREATMENT

The wastewater collection and treatment system is essential to insuring the health and welfare of the community's environment and to support current and future needs. A central system is used to collect, treat, and dispose of the wastewater at a low risk for environmental hazards.

The Troy Wastewater Treatment Plant (WWTP) is located at 1400 Dye Mill Road. The first treatment plant began operation on this site in 1939. Subsequent improvements took place in the early 1950's and early 1960's, and in 1974 the plant underwent a major overhaul, creating the basis for the present WWTP operating as a conventional activated sludge plant in the contact stabilization mode. Between 1995 and 2002 the City completed a series of phased expansions, adding a 2-stage screw pump station and equalization tanks, power station upgrade, additional secondary clarification, ultraviolet disinfection, and installed odor control technology on its biosolids treatment process. Future planned improvements include expanding primary clarification and activated sludge aeration processes, as may be dictated by system demands or regulatory changes, including a possibility for enhanced removal of nutrients such as phosphorous and nitrogen. When completed, these phased improvements will allow the WWTP to treat an average daily flow of 9.8 million gallons of wastewater.

The WWTP provides treatment to all industrial and domestic users of water within the City of Troy and cer-

tain surrounding areas of Miami County, where the City sells service to Miami County through an agreement. The WWTP treated an average of 5.73 million gallons of wastewater per day in 2001, 6.59 MGD in 2003, and over the period of January 2003 through August 2004 averaged 6.19 MGD. Discharge is to the Great Miami River. The WWTP has a current NPDES (National Pollutant Discharge Elimination System) permit for the treatment capacity of 7 million gallons per day. The highest, recent hydraulic load on the WWTP was recorded July 7, 2003 at 16.89 MG.

The WWTP is well-positioned to accommodate present users. The future expansion noted above will allow the WWTP to handle increasing hydraulic and biologic loads well into the future.

Figure 7-3, located at the end of this chapter, illustrates the "Troy Area Sewer District". All wastewater is collected and moved through this system of sewer mains. Several pump or lift stations exist in the collection system due to the topography of the City, with the main lift station being located at the POTW (Publicly Owned Treatment Works, Ohio EPA terminology) or WWTP. Lift stations, sites where wastewater is lifted mechanically from one sewer elevation to another and allowed to proceed toward the WWTP under gravity flow, include: Fernwood, Heywood, and Dakota locations. Pump stations, sites where the wastewater must be lifted from one elevation and transported via a force main to a higher elevation gravity sewer include: Kirk/Fairfield, Dorset, and a new pump station under construction in the Nottingham residential plat.

The Sewer Maintenance unit within the Utilities Division is responsible for inspection, maintenance and repairing over 122 miles of sanitary sewer ranging from 6 inch to 42 inch diameter mains. Crews use advanced technology to clean and inspect the sewer system to ensure efficient transportation of sewage to the Wastewater Treatment Plant. Sewer Maintenance and WWTP staff also maintain the City's two storm water lift stations. A "jet-vac" sewer cleaning machine (shown in insert) and internal video inspection of mains are keys to proper inspection and keeping sewers in good working order. The sanitary sewer system's oldest components date to about 1903. Annual revenues and carryovers allow for sufficient funds to make needed improvements.

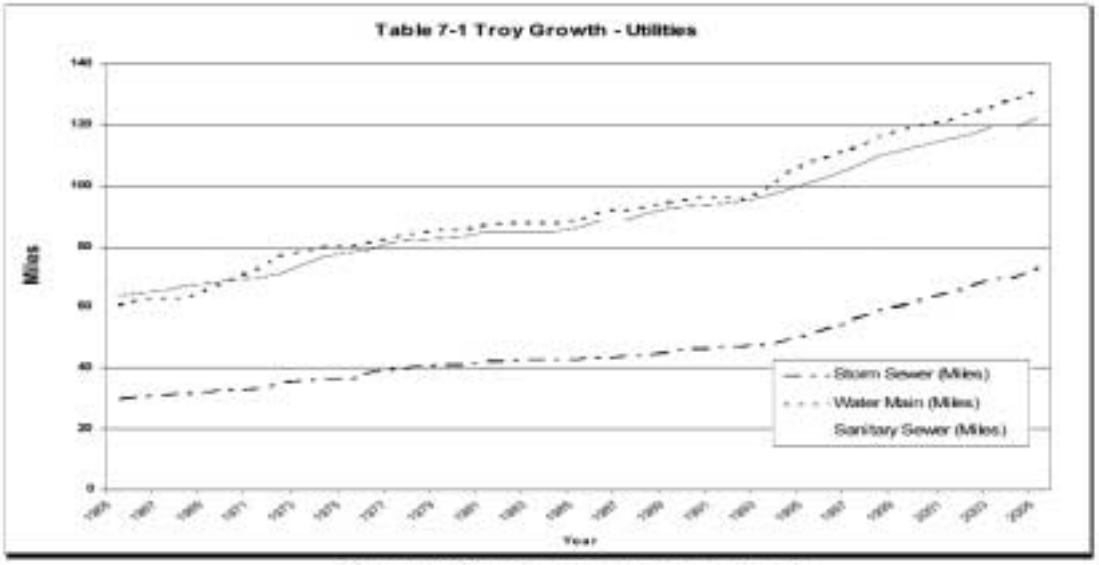
GROWTH TRENDS

Growth trends have been created from data collected over the years from the Operations, Utilities and Engineering Divisions of the Troy's Public Works Department. Tables 7-1 to 7-4 illustrate the various growth trends dating back to 1965 to the present in terms of the number of linear miles of infrastructure and the square miles of land area inside the City limits.

Table 7-1 Troy Growth - Utilities 1965 to Present

The number of constructed miles for water, sanitary and storm sewer systems are illustrated in Table 7-1, indicating a steady trend of growth from 1965 to early 1990's. The average growth rate for both water and sanitary sewer lines during this time period was approximately 1.1 miles per year (See Table 7-4). Also from 1965 to the early 1990's, storm sewer had an average growth rate of 0.6 miles a year.

However, as indicated in the below table, since the early 1990's to present, there has been a significant increase in growth of Troy's water and sewer facilities. The growth rate for both water and sanitary sewer lines averaged 2.2 miles a year, with storm sewer averaging 2.0 miles a year. The water and sanitary sewer rates have doubled, while the storm sewer installation rate has increased roughly 3 times over the 38 year period. This increase can be related to the added requirements for storm sewer installations due to flatter topography and slope in the newer development areas of Troy.



Source: City of Troy, Engineering Division

Table 7-2 Troy Growth - Area of the City
1965 to Present

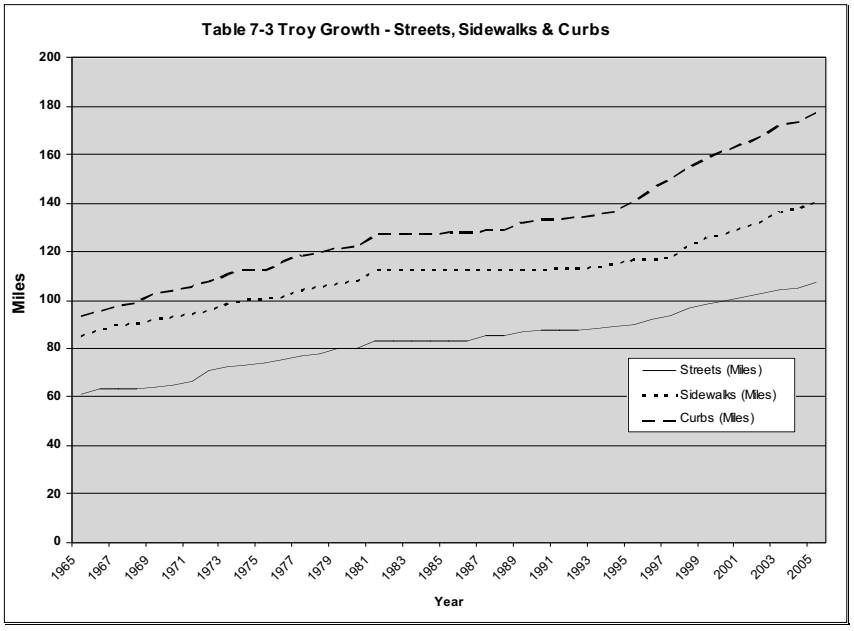
Growth of land area increases by annexation from adjacent Staunton and Concord Townships, into the City of Troy corporation limits. The area line graph depicts the growth trend from 1965 to the present.

Source: City of Troy, Engineering Division

The growth rate from the mid 1960's through the1970's saw an annual average increase of about 0.2 square miles per year. This 5% annual increase hit a plateau and dropped in half during the 1980's and early 1990's. Annexation and growth than took off around 1999 to the present, with an average growth rate of 0.5 square miles per year. Only future data will prove if this trend is sustained or whether a few large annexations such as "Goodrich-Robinson", "Miami Shores" and "WACO" have skewed the trend over a short period of time. See "Chapter 9 Land Use Trends" for more on annexations and land area.

Table 7-3 Troy Growth - Streets 1965 to Present

As in the case with water and sewer lines, the amount of streets, sidewalks and curbs have also increased with the general growth of the City. The constructed infrastructure is measured in linear miles and illustrated in trend lines below.



Source: City of Troy, Engineering Division

Dating from 1965 to present, both constructed streets and sidewalks have averaged at 1.1 miles per year. Curbs had an average rate of 1.4 miles a year from 1965 to 1994, and have increased to nearly 4 miles per year since. The increase in curbs is partly due to several significant street improvement efforts in the past eight years.

Rates of increase have averaged about 1.5% generally for all street improvements and additions, except for the recent rise in curbs indicating over a 2.5% growth rate annually since 1994.

Table 7-4 Troy Growth Statistics - 1965 to Present

Table 7-4 contains the statistics collected for streets, sidewalks, curbs and the utilities in terms of linear miles. The statistics for area were collected in terms of acres and square miles within the City corporate limits.

Date	Acres	Troy Square Miles	Street (Miles)	Sidewalk (Miles)	Curbing (Miles)	Storm Sewer (Miles)	Sanitary Sewer (Miles)	Water Main (Miles)
January 1, 1965	2,643.533	4 .131	60.99	85.35	93.24	30.33	64.05	60.68
June 21, 1965	2,672.793	4.176						
August 16, 1965	2,830.604	4.423						
January 1, 1966	2,830.604	4.423	63.34	87.59	95.64	30.93	65.20	62.99
January 1, 1967	2,830.604	4.423	63.49	90.00	98.08	31.46	65.85	63.21
January 1, 1968	2,830.604	4.423	63.49	90.50	99.08	31.85	67.22	63.66
January 1, 1969	2,830.604	4.423	64.30	92.29	103.19	32.67	68.18	66.71
June 2, 1969	2,841.168	4.439						
No vem ber 17, 1969	2,868.846	4.483						
January 1, 1970	2,868.846	4.483	65.20	93.44	104.42	33.18	69.23	69.62
Decem ber 21, 1970	2,881.611	4.503						
January 1, 1971	2,881.611	4.503	66.05	94.69	105.68	33.70	69.61	72.61
F ebruary 1, 1971	3,698.231	5.778						
August 5, 1971	3,774.316	5.897						
January 1, 1972	3,774.316	5.897	70.59	95.77	107.57	35.18	71.02	77.15
July 17, 1972	3,796.029	5.931						
January 1, 1973	3,796.029	5.931	72.31	99.11	110.91	36.34	73.74	78.84
April 19, 1973	3,809.514	5.952						
M ay 7, 1973	3,831.939	5.987						
January 1, 1974	3,831.939	5.987	72.98	100.68	112.48	36.69	76.57	80.08
July 15, 1974	3,975.394	6.212						
January 1, 1975	3,975.394	6.212	73.57	100.68	112.78	36.69	77.72	80.45
M ay 5, 1975	4,153.687	6.490						
January 1, 1976	4,153.687	6.490	75.28	101.70	116.16	38.95	78.90	8162
January 1, 1977	4,153 .687	6.490	76.64	104.42	118.88	40.02	81.25	83.52
November 7, 1977	4,179 .661	6.531						
January 1, 1978	4,179 .661	6.531	77.40	105.94	120.40	40.58	82.01	84.47
July 5, 1978	4,453.620	6.959						
January 1, 1979	4,453.620	6.959	79.82	107.13	121.59	41.29	82.85	85.39
January 1, 1980	4,453.620	6.959	80.25	107.99	122.45	41.59	83.28	85.86
January 1, 1981	4,453.620	6.959	82.70	112.81	127.27	42.71	85.12	87.66
April 8, 1981	4,456.178	6.963						
January 1, 1 982	4,456.178	6.963	82.70	112.81	127.27	42.74	85.12	87.78
January 1, 1983	4,456.178	6.963	82.70	112.81	127.27	43.19	85.12	87.78
January 1, 1984	4,456.178	6.963	82.85	112.81	127.27	43.47	85.32	87.94
January 1, 1985	4,456.178	6.963	82.85	112.81	128.00	43.47	86.22	88.84
July 9, 1985	4,461.569	6.971						
January 1, 1986	4,461.569	6.971	82.85	112.81	128.00	43.88	88.44	92.05
January 1, 1987	4,887.331	7.636	84.98	112.81	128.80	44.29	88.68	92.05
January 1, 1988	4,911.444	7.674	85.04	112.85	128.90	44.58	90.92	93.47
January 1, 1989	5,068.962	7.920	86.68	112.85	132.20	45.93	92.71	94.91
January 1, 1990	5,213.451	8.146	87.21	112.85	133.30	46.56	93.41	96.14
January 1, 1991	5,213.451	8.146	87.52	112.96	133.93	47.12	93.81	96.44
January 1, 1992	5,336.222	8.338	87.90	113.53	134.69	47.34	94.98	95.65
January 1, 1993	5,336.222	8.338	88.15	113.90	135.19	48.11	96.24	98.38
January 1, 1994	5,336.222	8.338	88.77	115.14	136.43	49.39	98.69	104.40
January 1, 1995	5,576.508	8.713	89.84	116.89	140.95	51.16	100.89	107.74
January 1, 1996	5,578.148	8.716	91.90	117.32	145.83	53.55	103.42	110.22
January 1, 1997	5,644.918	8.820	93.93	117.60	149.99	56.63	106.32	112.75
January 1, 1998	5,799.892	9.062	96.63	122.63	155.39	59.37	109.79	116.19
January 1, 1999	5,799.892	9.062	97.86	126.03	158.69	61.09	111.68	118.53
January 1, 2000	5,917.098	9.245	99.45	127.49	161.87	63.02	113.39	120.11
January 1, 2001	6,206.99	9.698	100.88	130.59	164.84	64.81	114.86	121.62
January 1, 2002	6,846.20	10.697	102.35	132.6	167.98	67.25	116.96	123.83
January 1, 2003	7,485.41	11.696	104.45	136.8	172.33	69.95	119.16	126.23
January 1, 2004	7,485.41	11.696	105.05	137.48	173.38	70.27	119.22	128.81
January 1, 2005	7,775.87	12.150	107.49	141.16	178.26	73.08	121.9	131.31

Source: City of Troy, Engineering Division

ELECTRICITY, GAS AND TELEPHONE SERVICES

In Troy, private utility companies operate most of the public utilities other than the municipal water and sewer systems. These include power companies that supply natural gas and electric, and numerous telecommunications providers. Telephone and data service is also provided by some companies that do not use standard distribution wires, but have microwave or radio technology such as cell phones operated from broadcast towers. The principal providers of traditional public utilities are listed below.

Dayton Power and Light Company

Dayton Power & Light Company (DP&L) is the principal subsidiary of DPL Inc. DP&L delivers electricity to 500,000 customers in 24 counties of West Central Ohio.

Pioneer Rural Electric Cooperative

Pioneer Electric Cooperative is a not for profit consumer-owned electric utility delivering electric needs to nearly 16,000 member-owners in Miami, Champaign and Shelby counties in Ohio.

Vectren Corporation

Vectren Corporation supplies natural gas service in Troy and the rest of Miami County. This diversified energy and applied technology company serves 953,000 customers in Ohio and Indiana. Vectren offers energy conservation and planning services to Troy customers at its Troy office on Experiment Farm Road.

Verizon

Verizon provides telephone service in the greater Troy area. Verizon offers high-speed data transmission over fiber optic telephone lines. Also provided are network-consulting services, data consulting services, architects and builder's service/building wiring, and sales and service on both leased and direct sales telephone systems.

Time-Warner

Time-Warner provides cable TV and broadband telecommunications service in Troy and surrounding counties. Service is generally available in most residential areas. Rural areas and industrial parks with few potential customers often do not have a nearby cable line available.